without any prior experience whatever. Nothing is less difficult, whether for man or brute, than to tread water, even for the first time. I have done so often, using the feet alone or the hands alone, or the whole four, many times, with perhaps one of my children on my back. Once I recollect being carried a good way out to sea by the receding tide at Boulogne, but regained the shore without difficulty. A drop of water once passed through the rima of the glottis, and on another occasion I experienced such sudden indisposition that if I had been unable to float, it must, I think, have gone hard with me.

Men and animals are able to sustain themselves for long distances in the water, and would do so much oftener were they not incapacitated, in regard of the former at least, by sheer terror, as well as complete ignorance of their real powers. Webb's wonderful endurance will never be forgotten. But there are other instances only less remarkable. Some years since, the second mate of a ship fell overboard while in the act of fisting a sail. It was blowing fresh; the time was night, and the place some miles out in the stormy German Ocean. The hardy fellow nevertheless managed to gain the English coast. Brock, with a dozen other pilots, was plying for fares by Yarmouth; and as the main-sheet was belayed, a sudden puff of wind upset the boat, when presently all perished except Brock himself, who, from four in the afternoon of an October evening to one the next morning, swam thirteen miles before he was able to hail a vessel at anchor in the offing. Animals themselves are capable of swimming immense distances, although unable to rest by the way. A dog recently swam thirty miles in America in order to rejoin his master. A mule and a dog washed overboard during a gale in the Bay of Biscay have been known to make their way to shore. A dog swam ashore with a letter in his mouth at the Cape of Good Hope. The crew of the ship to which the dog belonged all perished, which they need not have done had they only ventured to tread water as the dog did. As a certain ship was labouring heavily in the trough of the sea, it was found needful, in order to lighten the vessel, to throw some troop-horses overboard which had been taken in at Corunna. The poor things, my informant, a staff-surgeon, told me, when they found themselves abandoned, faced round and swam for miles after the vessel. A man on the east coast of Lincolnshire saved quite a number of lives by swimming out on horseback to vessels in distress. He commonly rode an old grey mare, but when the mare was not to hand he took the first horse that offered.

The loss of life from shipwreck, boating, bathing, skating, fishing, and accidental immersion is so disastrously great, that every feasible procedure calculated to avert it ought to be had recourse to. People will not consent to wear life-preservers, but if they only knew that in their own limbs, properly used, they possessed the most efficient of life-preservers, they would most likely avail themselves of them. In every school, every house, there ought to be a slate tank of sufficient depth, with a trickle of water at one end and a syphon at the other, in order to keep the contents pure. A pail or two of hot water would at any time render the contents sufficiently warm. In such a tank every child from the time it could walk ought to be made to tread water daily. Every adult, when the opportunity presents itself, should do so. The printed injunction should be pasted up on all boat-houses, on every boat, at every bathing place, and in every school. "Tread water when you find yourself out of your depth" is all that need be said, unless indeed we add, "Float when you are tired." Every one, of whatever age or sex, or however encumbered with clothing, might tread water with at least as much facility, even in a breaking sea, as a four-footed animal does. The position of a person who treads water is, in other respects, very much safer and better than is the sprawling attitude which we assume in ordinary swimming. And then the beauty of it is that we can tread water without any preliminary teaching, whereas "to swim" involves time and pains, entails considerable fatigue, and is very seldom adequately acquired after all.

The Indians on the Missouri River, when they have occasion to traverse that impetuous stream, invariably tread water just as the dog treads it. The natives of Joanna, an island on the coast of Madagascar, young persons of both sexes, walk the water carrying fruit and vegetables to ships becalmed, or it may be lying-to, in the offing miles away. Some Croomen whose canoe upset before my eyes in the seaway on the coast of Africa walked the water, to the safe-keeping of their lives, with the utmost facility; and I witnessed negro children on other occasions doing so at a very tender age. At Madras, watching their opportunity, messengers, with letters secured in an oilskin cap, plunge into the boiling surf, and make their way, treading the water, to the vessels outside, through a sea in which an ordinary European boat will not live. At the Cape of Good Hope men used to proceed to the vessels in the offing through the mountain billows, treading the water as they went with the utmost security. And yet here, on our own shores, and amid smooth waters, men, women, and children perish like flies annually, when a little properly-directed effort—treading the water as I have said—would haply suffice to rescue them every one.

Belfast HENRY MACCORMAC

NOTES

WE learn from the *Times* that at the meeting of the Royal Society on Thursday last the vacancies in the list of foreign members were filled by the election of Gabriel Auguste Daubrée of Paris, Jean Charles Marignac of Geneva, Carl Nägeli of Munich, and Carl Weierstrass of Berlin.

SIR JOHN LUBBOCK has been nominated to succeed Prof. Allman as president of the Linnean Society, and Mr. G. J. Romanes for the post of zoological secretary, vacant by Mr. Alston's lamented death.

IN the current number of the *Revue Scientifique* there is an article by M. de Lacaze-Duthiers descriptive of an interesting enterprise on which he is engaged, viz. the construction of a zoological laboratory at Port Vendres. Backed by the recommendation of the Academy of Sciences, he obtained a liberal offer from the municipal authorities of the place, which among other considerations determined him in the selection of the site. Altogether he is provided with 32,000 francs as a capital sum, 750 francs per annum as a fixed income, with the gift of building ground and a boat. It will thus be seen that the municipal authorities deserve all credit for the substantial encouragement which they have extended to the undertaking. In a few months the laboratory will be completed, and is then to be thrown open to workers of all nationalities. As its situation on the coast of the Mediterranean is an admirable one for the procuring of fauna, the institution is in every way favourably circumstanced, and we cordially wish it all success.

THE English Transit of Venus Commission having expressed a desire for an understanding with the French Commission, so as to secure a uniform method of observation, M. d'Abbadie and M. Tisserand are coming to London to compare notes with the English Commission.

A LETTER from M. Mascart, director of the French Central Meteorological Bureau, read at last week's meeting of the Paris Academy of Sciences, stated that the French Government intend to establish an observatory for terrestrial magnetism at Cape Horn. The expedition will set out in the same vessel as will take the astronomers who are to observe the approaching transit of Venus. This is intended as the contribution of France to the international scheme of polar observations, to which England has as yet made no sign of lending her aid.

Messrs. Siemens and Halske gave a public trial last week of their new electric railway, which runs between Lichterfelde and the Cadettenhaus, about six miles from Berlin. The trial is stated to have been most successful. It was in a simple tram-car, with an electric battery totally concealed between the wheels, in connection, through the rails it ran on, with the principal battery at the station. The rails are three feet three inches apart, and exactly resemble those of an ordinary railroad, only the gauge being narrower. The greatest speed obtained on a distance of about one and a half mile was eighteen English miles an hour. Dr. Siemens has proved that if necessary a far greater speed could be obtained, but this is not allowed by the German police authorities. It will not be allowed to proceed at more than nine miles per hour. The railway was opened to the public on Monday.

M. Pouchet with two assistants are about to proceed to Vadsö, on the east coast of Finmark, to collect natural history specimens for the Paris Museum of Natural History.

An interesting paper on recent earthquakes in Japan has lately been published by Prof. John Milne, vice-president of the Seismological Society of Japan. To get an arrangement which will cause a clock to stop at exactly the same tremor during an earthquake as another similar clock is stopped at, to get a complete time record of the tremors at any place, and to find accurately the direction of the transmission of earth vibrations, these are the questions which Mr. Milne and his friends have been trying to surmount with the help of a grant of money from the British Association and the help of the Japanese Telegraph Department. A result of the work hitherto done is that there is a chronic centre of disturbance within a radius of a few miles from Yokohama, and Mr. Milne felicitates the inhabitants of that seaport on the advantages which their position gives them for seismological observation. The Society has also issued useful forms in which to record earthquake observations, which might supply hints to European observers.

At the Victoria (Philosophical) Institute, on Monday, a paper on "The Rainfall and Climate of India" was read by Sir Joseph Fayrer, K.C.S.I., F.R.S. He reviewed the causes and effects of those climatic changes which obtain in that country at the present time, and many of which once operated in Palestine and Egypt, not to mention England and other parts of the world, and threw light on questions involving the denudation theory, the variation of river deposits, and other matters affecting the uniformitarian theory of geology. Sir Joseph Fayrer spoke at some length in regard to the climate of India, and showed that, if what science had taught us in regard to the effects of cultivation, the preservation of the forests, drainage, &c., were carefully attended to by the powers that be, the importance of the results could not be estimated, as they involved the health and prosperity of that great country.

In connection with the subject of "Fascination," Dr. Otto of Schemnitz, Hungary, writes us of a case which came under his notice. In 1859, when the use of firearms was under stringent regulations in Hungary, peasants often killed hares on the Danubian island Creppel in the following way:—Two peasants would drive in a cart over the reaped fields. On spying a hare (say at two to three hundred paces) they proceeded to drive round it some five or six times in succession. One peasant carrying a long stick at length sprang out, at the moment the cart was behind the hare (the cart continuing its course), and coming up to the animal slowly, killed it without difficulty. It was not uncommon to kill thus as many as six or seven hares in one morning.

The following instance of animal intelligence is sent to us by Dr. John Rae, F.R.S., who states that the Mr. William Sinclair mentioned is respectable and trustworthy. The anecdote is taken from the *Orkney Herald* of May 11:—"A well-authenticated and extraordinary case of the sagacity of the Shetland pony has just come under our notice. A year or two ago Mr. William Sinclair, pupil teacher, Holm, imported one of these little animals from Shetland on which to ride to and from school, his residence being at a considerable distance from the school buildings. Up to that time the animal had been unshod, but some time afterwards Mr. Sinclair had it shod by Mr. Pratt, the parish blacksmith. The other day Mr. Pratt, whose smithy is a long distance from Mr. Sinclair's house, saw the pony, without halter or anything upon it, walking up to where he was working. Thinking the animal had strayed from home, he drove it off, throwing stones after the beast to make it run homewards. This had the desired effect for a short time; but Mr. Pratt had only got fairly at work once more in the smithy when the pony's head again made its appearance at the door. On proceeding a second time outside, to drive the pony away, Mr. Pratt, with a blacksmith's instinct, took a look at the pony's feet, when he observed that one of its shoes had been lost. Having made a shoe he put it on, and then waited to see what the animal would do. For a moment it looked at the blacksmith as if asking whether he was done, then pawed once or twice to see if the newly-shod foot was comfortable, and finally gave a pleased neigh, erected its head, and started homewards at a brisk trot. The owner was also exceedingly surprised to find the animal at home completely shod the same evening, and it was only on calling at the smithy some days afterwards that he learned the full extent of his pony's sagacity."

M. J. Plateau has issued a second supplement to the "Bibliographie Analytique des Principaux Phènomenés Subjectifs de la Vision," comprising the years 1878-79. It is reprinted in a separate form from the *Memoirs* of the Belgian Academy.

We have received the first three parts of the *Zeitschrift für Instrumentenkunde*, a monthly journal intended to bring together all novelties in scientific apparatus. It is edited by Dr. George Schwiskus, assisted by a large staff, and published by Julius Springer of Berlin. It is amply illustrated and its utility is obvious.

M. Carnot, the grandson of the celebrated War Minister of the First Republic, has taken an important step in his capacity of Minister of French Public Works. He sent to the Lower House a *projet de loi* asking for a credit of 280,000*l*. in order to introduce at once into all the French lighthouses magneto-electric generators and acoustical signals with steam blower. This proposal is sure to be accepted with enthusiasm, and executed with the utmost rapidity.

The General Council of the Seine have granted the credits asked by the Préfet for establishing in the Morgue a refrigerating machine by MM. Mignon and Rouard. Ammonia is the substance which has been considered as the most powerful and cheapest by a special commission appointed by the Council of Hygiene. Laboratories will be annexed to the establishment. The work will begin as soon as Parliament has voted a small sum for contributing to the expense.

M. Barthélemy St. Hilaire, French Minister of Foreign Affairs, has recommended to M. Cochéry a suggestion of M. W. de Fonvielle's advising the appointment of a commission on the state of international law relating to ocean telegraphic cables, and the means of improving it. M. St. Hilaire states that in case the Congress of Electricians comes to any conclusion relating to this most important object, he is ready to send a circular to the several Governments on the opening of an international conference on the matter. This official correspondence will be published in full in the next number of *L'Électricité*.

WE take the following from the *Colonies and India*:—"To say that a train had been stopped by caterpillars would sound like a Yankee yarn, yet such a thing (according to the *Rangitikei Advocate*) actually took place on the local railway a few days ago. In the neighbourhood of Turakina, New Zealand, an army of caterpillars, hundreds of thousands strong, was marching across the line, bound for a new field of oats, when the train came along. Thousands of the creeping vermin were crushed by the wheels of the engine, and suddenly the train came to a dead stop. On examination it was found that the wheels of the engine had become so greasy that they kept on revolving without advancing—they could not grip the rails. The guard and the engine-driver procured sand and strewed it on the rails, and the train made a fresh start, but it was found that during the stoppage caterpillars in thousands had crawled all over the engine, and over all the carriages inside and out."

A SHOCK of earthquake is reported from Möttling (Carniola) on April 26, at 4.55 p.m., direction from north to south. At Tüffers (Styria) a smart shock was felt on May 6, at 7.41 p.m., duration three seconds, direction north-east to south-west.

ON Tuesday last week, the Princess Christian of Schleswig-Holstein presented the prizes and certificates adjudged to candidates in a competitive examination on "Domestic Sanitation," following a course of lectures delivered on the subject by Dr. B. W. Richardson. With regard to the course of lectures he had given at the request of the Ladies' Sanitary Association, Dr. Richardson stated that nearly 300 pupils attended, of whom seventy-five competed for the prizes offered by Mr. Edwin Chadwick and others. Of the papers sent in, he could say that all the writers showed a sound knowledge of four subjects, viz. the relative values of the substances used as foods, the circulation of the blood, the process of breathing, with the conditions which produce a pure and healthy dwelling, and the management of a sick room. Dr. Richardson announced that, by desire of the Ladies' Sanitary Association, he should deliver another course of lectures, beginning in October next, on the nervous system. This would raise questions concerning education and other interesting and, at present, debatable matters.

IN the *Revue Scientifique* for May 14 is the conclusion of a long paper on the Physiological Immunities enjoyed by the Jewish race, in which the nature of these immunities is examined and the probable reasons for them given.

THE additions to the Zoological Society's Gardens during the past week include an Indian Fruit Bat (*Pteropus medius*) from India, presented by Mr. Edwin H. Maskell; a Wood Brocket (*Cariacus nemorivagus*) from South America, presented by Capt. Mackenzie, s.s. *Severn*; an Egyptian Gazelle (*Gazella dorcas*) from Egypt, presented by Mrs. J. J. Jones; a Common Hare (*Lepus europæus*), British, presented by Mr. Wormald, F.Z.S.; two Hawfinches (*Coccothraustes vulgaris*), British, presented by Dr. Bree; three Viperine Snakes (*Tropidonotus viperinus*) from North Africa, presented by Mr. J. C. Church; a Common Adder (*Vipera berus*), British, presented by Mr. G. H. King; a Three-striped Paradoxure (*Paradoxurus trivirgatus*) from India, a Javan Adjutant (*Leptoptilus javanicus*) from Java, received in exchange; six Rose-coloured Pastors (*Pastor roseus*) from India, two Mandarin Ducks (*Aix galericulata*) from China, purchased; a Blue and Yellow Macaw (*Ara ararauna*) from South America, deposited; a Geoffroy's Dove (*Peristera geoffroii*), three Red-crested Whistling Ducks (*Fuligula rufina*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

VARIABLE STARS.—Mira Ceti, which was at its minimum on March 20, according to Prof. Schönfeld's formula in his second catalogue of variables, will attain a maximum by the same on July 8, and may therefore be observed as it approaches that phase. The next maximum takes place on April 1, 1882, and will not be observable.

χ Cygni, by the recent observations of Prof. Julius Schmidt, may also be expected to reach its maximum about July 10, perhaps a few days later: the last maximum occurred on May 30, 1880, when the star was 6m.; it has occasionally attained 4m. at maximum. The perturbations in this case appear to be considerable.

The position of the variable usually designated *Nova* 1848 may be identified by means of Prof. Schmidt's observations of neighbouring stars. In *Astron. Nach.*, No. 1708, he gives the following places for 1855·0:—

Mag.		R.A. h.	m.	s.		Decl. °	′	″	
11	...	16	50	53·3	...	−12	43	57	
13	...	—	51	18·1	...	12	42	0	
13·12	...	—	51	22·5	...	12	40	3	*Nova* 1848
11	...	—	51	44·8	...	12	47	8	
11	...	—	51	51·9	...	12	31	57	
10·11	...	16	53	9·2	...	−12	47	2	

Further, the variable follows the star, Lalande's star 30,853 a ninth magnitude, 14·8s., and is north of it 18′ 21″.

Prof. Winnecke's star of the twelfth magnitude, in close proximity to the place of Kepler's *Nova* 1604, deduced from t observations of Fabricius, and apparently in the position of a star marked 10m. by Chacornac, but not since observed of that brightness, well deserves watching, and it would be interesting to possess a carefully-formed map of all stars visible in the vicinity of Kepler's celebrated star, with the aid of one of our most powerful telescopes—similar to that prepared by D'Arrest with the Copenhagen refractor for the vicinity of Tycho's *Nova* 1572 in Cassiopea. Prof. Winnecke's star precedes the 9m., No. 16872 in Oeltzen's Argelander 33·2s., and is 2′ north of it.

THE SATELLITES OF SATURN.—Observations of these satellites are still followed up at the Observatory of Toulouse, and M. Baillaud has communicated a series made about the last opposition of the planet to the Paris Academy of Sciences. Amongst them are a number of observations of *Mimas*, consisting mainly of elongations, but with several attempts to fix the moments when the satellite was on the tangent to the extremity of the ring. M. Baillaud does not appear to regard the latter observation with favour, on account of the difficulty attending it, but proposes to gain further experience of the degree of precision of which it admits. The later observations of *Mimas* are as follows:—

1880				h.	m.	s.
Nov. 1	...	W.	...	6	59	40
13	...	W.	...	12	58	17
23	...	E.	...	10	33	13
Nov. 25	...	N.E.	...	10	23	50
Dec. 18	...	W.	...	10	1	7
19	...	W.	...	8	42	33

The times are mean times at Toulouse, 3m. 29·9s. west of the Observatory of Paris. The observation of November 25 relates to the passage of the satellite by the tangent to the extremity of the ring.

Dr. M. W. Meyer of Geneva publishes elements of *Enceladus*, *Tethys*, *Dione* and *Rhea*, obtained on a new method, from observations made with the 10-inch Geneva refractor. By the way he terms the second of these satellites *Thetis*, not the only time that Sir John Herschel's proposed designation has been mistaken of late. *Thetis*, as is well known, is appropriated for one of the minor planets discovered by Dr. R. Luther.

SWIFT'S COMET (1881 *a*).—M. Bigourdan has calculated the following elements of this comet, from the Dun Echt observation on May 2 and observations made at Paris on May 5 and 7:—

Perihelion passage 1881, May 21·0613, Paris M.T.

	°	′	″	
Longitude of perihelion	297	54	43	M. Eq. 1881·0
„ „ ascending node	119	24	5	
Inclination	81	40	56	
Log. distance in perihelion	9·75568			

Motion—direct.

Though observations will not be longer practicable in these latitudes the comet may perhaps be observed in the southern